**MAT265 Quiz 11/9/23** **Name: KEY**

Show work, be neat. Submit to the Canvas site by midnight on the 10th, one page PDF. Original work only. Beware, sites like wolfram, desmos, etc, show things in unique ways and we'll know if you used it.

1. Find the following antiderivatives. Hint: simplify the integrands first if possible.

[4 pts]

a) $\int (x^2+3)(2x-5)\,dx = \int (2x^3-5x^2+6x-15)\,dx = \frac{1}{2}x^4 - \frac{5}{3}x^3 + 3x^2 - 15x + C$

b) $\int 4\cos(5x)\,dx = \frac{4}{5}\sin(5x) + C$

c) $\int \left(e^{3x} + \frac{5}{\sqrt{x}}\right) dx = \frac{1}{3}e^{3x} + 10\sqrt{x} + C$

d) $\int \left(\frac{2x^3+5x^2+4x+3}{x}\right) dx = \int 2x^2 + 5x + 4 + \frac{3}{x}\,dx = \frac{2}{3}x^3 + \frac{5}{2}x^2 + 4x + 3\ln x + C$

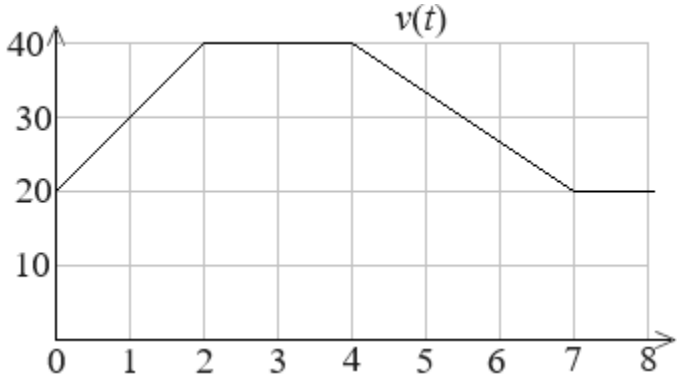
2. Joey rides his bicycle at 15 miles per hour for 3 hours, then after he pops a tire, he walks his bike for another 2 hours at 4 miles per hour before arriving at his dorm. If $v(t)$ describes Joey's velocity for the entire 5 hours, evaluate $\int_0^5 v(t)\,dt$ and explain what it means (include units).

[2 pts]

$\int_0^5 v(t)\,dt = 15(3) + 2(4) = 53$ miles. He travelled 53 miles in 5 hours.

3. Below is a graph of $v(t)$, describing the velocity of a person on a moped over an 8-hour period, where the time is in hours and the velocity is in km/hr. Evaluate the integrals, include units. Hint: use geometry.

[2 pts each]




a) $\int_0^4 v(t)\,dt = 140$ km

b) $\int_3^8 v(t)\,dt = 150$ km